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09/740,813	12/21/2000	Hiroyuki Sasai	2000_1748A	6574

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EXAMINER

LI, SHI K

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/740,813

Applicant(s)

SASAI ET AL.

Examiner

Shi K. Li

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 10-30 and 32-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of species I (claims 1-9 and 31) in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). The election is made final.

Drawings

2. FIGs. 1-3, 5-6 and 8 are objected to under 37 CFR 1.84(o) because there are no descriptive legends for the boxes (120, 370, 510). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Foord et al. (A. Foord et al., "Optical Demultiplexing for subcarrier Multiplexed Systems", IEEE Transactions on Microwave Theory and Techniques, Vol. 43, No. 9, September 1995).

Foord et al. teaches in FIG. 1 and the section I (Introduction) that a subcarrier optical signal can be selected by a filter and detection occurs at baseband using a photodiode. Foord et

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al. further teaches in section II (Optimum External Modulator Bias) and FIG. 2 that an external modulator can be used as a filter in a receiver for selecting any of the channels.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (U.S. Patent 5,432,632) in view of Nakajima et al. (M. Nakajima et al., "Subcarrier Homodyne Demultiplexing Scheme for SCM Optical Communication Systems", Microwave Photonics, 3-5 December 1996).

Watanabe teaches in FIG. 13 a subcarrier optical communication system. FIG. 13 comprises a plurality of data signals D_1 - D_N , modulators 1301-1 to 1301-N for modulating the carriers of different frequencies f_1 - f_N , a multiplexer for frequency division multiplexing (FDM) the modulated signals, and a light modulator 1303 for converting the FDM signal into optical signal. Watanabe indicates in FIG. 13 that the modulation can be one of amplitude modulation, frequency modulation, etc. The difference between Watanabe and the claimed invention is at the receiving end. Nakajima et al. teaches in FIG. 1 the use of a balanced demodulation circuit to extract one of the data signals. FIG. 1 of Nakajima et al. includes an external modulator driven by an electrical signal equal in frequency to one of the carriers f_1 - f_N and a pair of photodiodes for converting the optical signal into electrical signal using square detection. Based on the modulation method used to modulate the data signal, Nakajima et al. discusses on page 167-168

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various techniques to demodulate the data signal. One of ordinary skill in the art would have been motivated to combine the teaching of Nakajima et al. with the subcarrier optical communication system of Watanabe because the demodulation scheme of Nakajima et al. is free of intermodulation (see page 165, right col., 2nd paragraph). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the demodulation scheme of Nakajima et al. in the subcarrier optical communication system of Watanabe because the demodulation scheme of Nakajima et al. is free of intermodulation.

Regarding claim 2, Watanabe suggests in col. 9, line 39 that the data signals can be digital.

Regarding claim 3, Nakajima et al. teaches that by choosing the appropriate frequency for driving the external modulator, the corresponding data signal can be demodulated.

7. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe and Nakajima et al. as applied to claims 1-3 above, and further in view of Lam et al. (U.S. Patent 5,859,611).

Watanabe and Nakajima et al. have been discussed above in regard to claims 1-3. The difference between Watanabe and Nakajima et al. and the claimed invention is that Watanabe and Nakajima et al. do not teach the use of semiconductor optical amplifier (SOA). Lam et al. teaches in col. 3, lines 4-15 the advantage of using SOA as a modulator and its intermodulation effects. One of ordinary skill in the art would have been motivated to combine the teaching of Lam et al. with the modified subcarrier optical communication system of Watanabe and Nakajima et al. because SOA is easy to be fabricated and integrated with other system structures. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was

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made to use SOA as an external modulator, as taught by Lam et al., in the modified subcarrier optical communication system of Watanabe and Nakajima et al. because SOA is easy to be fabricated and integrated with other system structures.

8. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (U.S. Patent 5,896,211) in view of Nakajima et al. (M. Nakajima et al., "Subcarrier Homodyne Demultiplexing Scheme for SCM Optical Communication Systems", Microwave Photonics, 3-5 December 1996).

Watanabe discloses in FIG. 4 a WDM communication system. FIG. 4 comprises a plurality of OFDM modules A1-An. Each OFDM module comprises a plurality of data signals D_1 - D_k , modulators 31-1 to 31-k for modulating the carriers of different frequencies f_1 - f_k , and a light modulator 33 for converting the FDM signal into optical signal. The differences between Watanabe and the claimed invention are (a) Watanabe uses frequency modulation for the optical modulator and (b) Watanabe uses a different receiving scheme for the OFDM signals.

Watanabe teaches in FIG. 5 another OFDM module where the optical modulator uses one of amplitude modulation, frequency modulation and phase modulation. These modulation methods are equivalents and can be substituted with one for the other. One of ordinary skill in the art would have been motivated to combine the teaching of FIG. 5 with the WDM communication system of FIG. 4 and use amplitude modulation for the optical modulator because amplitude modulation requires less bandwidth and more suitable for WDM with close wavelength space. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use amplitude modulation for converting the electrical FDM signal into optical signal, as taught by FIG. 5 of Watanabe, in the WDM communication system of FIG. 4 of Watanabe

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because amplitude modulation requires less bandwidth and more suitable for WDM with close wavelength space.

The modified WDM communication system of Watanabe is still different from the claimed invention in the receiving scheme. Nakajima et al. teaches in FIG. 1 the use of a balanced demodulation circuit to extract one of the data signals. FIG. 1 of Nakajima et al. include an external modulator driven by an electrical signal equal in frequency to one of the carriers f_1 - f_k and a pair of photodiodes for converting the optical signal into electrical signal using square detection. Based on the modulation method used to modulate the data signal, Nakajima et al. discussed on page 167-168 various techniques to demodulate the data signal. One of ordinary skill in the art would have been motivated to combine the teaching of Nakajima et al. with the modified WDM communication system of Watanabe because the demodulation scheme of Nakajima et al. is free of intermodulation (see page 165, right col., 2nd paragraph). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the demodulation scheme of Nakajima et al. in the modified WDM communication system of Watanabe because the demodulation scheme of Nakajima et al. is free of intermodulation.

9. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. (M. Nakajima et al., "Subcarrier Homodyne Demultiplexing Scheme for SCM Optical Communication Systems", Microwave Photonics, 3-5 December 1996).

Nakajima et al. teaches in FIG. 1 the use of a balanced demodulation circuit for extracting signal of a channel in a subcarrier multiplexed (SCM, also known as frequency division multiplexed) optical signal. FIG. 1 of Nakajima et al. includes an external modulator

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driven by an electrical signal equal in frequency to one of the subcarriers ω_1 - ω_N and a pair of photodiodes for converting the optical signal into electrical signal using square detection. The difference between FIG. 1 and the claimed invention is that FIG. 1 uses a phase modulator because FIG. 1 assumed that the signal to be demodulated was phase modulated. Based on the modulation method used to modulate the data signal, Nakajima et al. discussed on page 167-168 various techniques to demodulate the data signal. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an external amplitude modulator in the receiver of Nakajima et al. if the signal was amplitude modulated at the transmitter.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 703 305-4341. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703 305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-3900.

skl


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